zeevee.com

Configuring ZeeVee Products

ZvCli User Manual

Revision 1.1

Advanced configuration for Commercial and Prosumer products

Configuring ZvBox can be as simple as changing the RF channel used for broadcast, or as powerful as associating audio ports with video ports and controlling how video gets processed and broadcast.

ZvCli also offers the ability to upgrade firmware in ZvBox, perform cable scans, and easily configure ZvBoxes in large deployments through batch processing.

If you run into any problems, please refer to the Zv Support page at www.zeevee.com, where you will find answers to frequently asked questions and helpful tips from ZeeVee experts. If you still cannot find the answers you need, our technical support hotline at 877-5ZEEVEE (877-593-3833) is here to help.

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Configuring ZeeVee's Products

ZeeVee products can be configured through a USB connection to a computer running ZvCli – a PC-based software application that can be downloaded from the ZeeVee website. Configuration is very simple, and usually just involves setting the RF channel on which the ZvBox will broadcast. On some products more advanced settings are available, such as associating audio and video inputs. Any settings that are made are stored in ZvBox and not lost on power-down.

Some ZeeVee products (primarily the Pro line) have an RS-232 serial port as well. This helps with remote management and input switching, and makes it possible to integrate ZeeVee products with traditional automation systems. Most settings and command syntax that are available through ZvCli are also available through the serial interface. Most notably missing are the ability to update the unit's Firmware, and the ability to save or load settings from a file. The command summary at the end of this document gives the port specifications.

Downloading and Installing ZvCli

ZvCli is available for download from the ZeeVee website at www.zeevee.com/commercial/downloads.

Important: ZeeVee regularly makes improvements to video and audio quality, and overall functionality. Always check for updated firmware for your ZvBox before deploying the unit. This is done by using the **"download check"** command in ZvCli.

Starting ZvCli

Once installed, ZvCli can usually be found under "Start / All Programs / Zv / ZvCli". Once launched, the program will attempt to communicate with your ZeeVee product via a USB connection. However, it is important to understand that ZvBox or ZvPro might not be 'listening' to the USB port. It is possible to configure the USB port on certain models to act as a USB audio device - once they are operating in that mode, ZvCli cannot communicate with ZvBox. To assure a connection, perform the following steps:

1. Start ZvCli. If the software reports that the connection succeeded, you are all set, and can continue to use ZvCli to configure the product.
2. If the software says that the connection is down (and displays the output text in red), unplug the USB cable between the ZvBox and the computer, and then reconnect it. Wait a few moments- if successful, ZvCli will automatically report that a connection is now available.

Note - If ZvBox was using the USB port as an audio device, audio will be disabled until you have completed configuration changes, exited from ZvCli, then disconnected and reconnected the USB cable.

Using ZvCli - Tips and Tricks

ZvCli is a very simple, yet very powerful interface. Here are a few tips that make using it easy. Note - most are identical through the serial connection as well.

- Factory defaults are underlined in this document where applicable.
- <> encase a value, {} encase a mandatory choice. [] encase optional parameters.
- Preceding any line with # makes the remaining text on that line a comment.
- Text strings that contain spaces, like channel names, need "quotes" around them.
- Really powerful – If you start typing any command and hit<TAB>, it will show you what your choices are and will auto-complete for you if it can. Give it a try. Tab will always do one of the following;
    - Add text to complete a command, or portion of a command

- Add a space after a complete command
- List command options that a user must select from

- If you are connected and communicating with a ZvBox, all text is show in white
  - If the connection is ever lost, a message is printed and the text turns red
  - During a reset or reboot, the text will turn red at first, then turn back to white when the connection is restored.

Quick-start

This document describes many settings that can be made to the ZvBox. At first glance, they can be intimidating and confusing, especially if you are not familiar with HDTV broadcasting and associated jargon. Fear not! In most cases, the only setting you will need to make is telling ZvBox what channel to broadcast on.

Note – make sure your HDTV is set in Cable mode, vs Antenna or Over-the-air mode. ZvBox broadcasts using QAM – the same standard used by cable companies.

1. Connect ZvBox to your computer using the included USB cable
2. Start ZvCli as described above
3. Enter the following commands:

   set rf-output off
   set rf-channel 53
   set mpeg2 program video1 hdtv-channel 53.1
   set mpeg2 program video1 long-channel-name "I just made this new channel"
   set rf-output on
   set audio-for-component spdif-coax

That's all there is to it! Your ZvBox should now be broadcasting on RF channel 53, and can be tuned in at your HDTV by entering 53.1. And, your new channel will be called "I just made this new channel" on the HDTV! Note – sometimes a channel scan is required at the HDTV before the new channel is recognized.

The rest of this manual will help you understand how to get software and firmware updates, and how to make other settings or get helpful information that may be useful in different scenarios.

CLI Commands

Status Commands

These commands help you see how the ZvBox is configured, as well as some internal status.

Show System Status

Shows a large variety of information about the system, including revisions, serial numbers, etc.

Syntax

show system-status

Example:

```
ZvCli$ show system-status
Model                          : ZvPro 250
Product serial number          : LXX8410004A
```

```
Hardware revision          : 1(17)
Uboot revision             : U-Boot 1.1.17 (Sep 24 2008 - 10:52:12)
Firmware revision          : 2.0.0.5783
Firmware install date      : Tue 2009-Jun-16 17:45:28 Eastern Daylight Time
Temperature                : Okay (42C, 41C, 44C)
Boot count                 : 58 OS boots, 91 Encoder boots
EDID underscan resolutions : 1152x648, 1088x612, 1216x684
USB device type            : serial/audio composite
Serial console baud rate   : 9600 (8-N-1)
Date/time on device        : 2008:01:01:00:11:19 UTC (Tue 2008-Jan-01 00:11:19 UTC)
Uptime (since OS boot)     : 1 day, 19 hours, 46 minutes, 13 seconds
ZvCli$
```

Show Audio / Video Status

Provides information about what ZvBox is seeing on its video inputs, what format is being used to broadcast, and other information that can be helpful during installation.

Syntax

show av-status

Example:

```
ZvCli$ show av-status
Transmit status          : Transmitting
Transmit rf-channel      : 2
Transmit hdtv-channel    : 2.1
Transmit modulation      : QAM
Transmit cable-plan      : standard
Input video source       : VGA
Input video format       : 1280x720 progressive
Output video format      : 720p
Input audio source       : spdif-coax
Input audio status       : supported format
Input audio format       : PCM
Input audio channels     : 2/0, L,R
Input audio bit-rate     : unknown
Input audio sample-rate  : 48000 Hz
Output audio status      : transmitting received audio
Output audio format      : AC3
Output audio channels    : 2/0, L,R
Output audio bit-rate    : 192 kbps
ZvCli$
```

Show Configuration

Shows the current configuration. It is presented in a format that can be played back to ZvCli, making it easy to copy the configuration of one ZvBox to others, or to restore settings at a later time. Also see the Script Read/Write commands.

Syntax

show config

Example:

ZvCli$ **show config**

```
set management-mode standalone
set audio-for-component analog
set audio-for-vga analog
set cable-plan standard
set mpeg2 dc-coefficient-size 10-bit
set mpeg2 audio-delay 5
set mpeg2 output-data-rate normal
set mpeg2 starting-pid-number 256
set mpeg2 program video1 eit-name "Video Over COAX"
set mpeg2 program video1 eit-tv-rating TV-G
set mpeg2 program video1 long-channel-name "Welcome To ZeeVee ZvCast"
set mpeg2 program video1 hdtv-channel 200.1
set mpeg2 program video1 program-number 1
set mpeg2 program video1 short-channel-name "ZvCast"
set name “myname”
set output-frame-rate-for-720p 30fps
set rf-channel 4
set rf-output on
set rf-power 5-highest
set vga-output-resolution auto
set video-source vga
set watermark-visual on

ZvCli$
```

Analyze Current Configuration and Status

ZvCli is able to look at ZvBox’s current configuration and status, and will report warnings when things look ‘odd’. The following items are currently checked.

- **Management Mode:** Should be set to Standalone for Zv250’s and Zv150’s.
- **Date:** Warning if the date on the computer differs greatly from the date in ZvBox.
- **Video Input:** Warning if the video format on the active video input is unrecognized.
- **Audio Input: Warning if the audio format on the active audio input is not recognized.**
- **RF Conflict:** ZvBox checks the selected RF channel for conflict before transmitting.

Syntax

show analysis

Example:

ZvCli$ **show analysis**

```
Host's current date/time          : 2009:02:02:15:00:21 UTC (Mon 2009-Feb-02 10:00:21 Eastern
Standard Time)
ZvBox date/time                   : 2008:01:04:20:56:56 UTC (Fri 2008-Jan-04 15:56:56 Eastern Standard
Time)
  The date/time on ZvBox is significantly different than the time
  on this machine (host).  You may wish to set the date/time via
  'set date'.
```

```
Transmit status                 : *Transmitting, conflict detected
  Energy was detected on this rf-channel, so there may be another
  source transmitting on this rf-channel.  If you experience problems
  tuning this channel, you may wish to scan for free rf-channels
  and change the configuration to transmit on a free rf-channel.
Input video resolution          : unrecognized
  Unable to determine the input video resolution.  Ensure that the
  video source is transmitting a standard resolution.
ZvCli$
```

Show ZvCli Information

Provides information about the running ZvCli.

Syntax

show zvcli-info

Example:

```
ZvCli$ show zvcli-info
ZeeVee Command Line Interface (version 2.1.0.5609)
Copyright 2009, ZeeVee Inc.
ZvCli$
```

RF, Cable and Broadcast Commands

These commands are used for settings related to the local cable plant, and how ZvBox will broadcast.

Cable Scan

ZvBox products contain a very powerful feature that helps the installer greatly – a built-in cable spectrum analyzer. When asked, ZvBox will stop transmitting, analyze every RF channel on the cable and report the result. The report shows if a channel is open or occupied, and if occupied, if the channel is Analog or Digital.

Syntax

system cable-scan [**cable-plan** {standard |HRC | IRC | **auto-detect** }]

You can optionally supply the cable plan (standard, HRC or IRC). If omitted, auto-detect is used.

The auto-detect option will try to determine the plan that is in use and behave accordingly. This is reliable when there are a reasonable number of other channels on the cable for the ZvBox to probe. A relatively empty cable may yield unreliable results. Connecting ZvBox to the cable plant using the same connection that you would connect an HDTV during the scan will yield the best results.

Scanning is done from the lowest RF frequency to the highest. The actual channel numbers do not smoothly increment in the same manner, making the report seems like it is jumping around. Please do not stop the scan prematurely. Many different parts of the system are involved with the scan, and may become confused if not allowed to complete their task.

Example: (some results omitted to save space)

```
ZvCli$ system cable-scan
Initiating scan, please be patient, this can take a few minutes...
First attempting to determine cable plan in use on the cable...
Detected cable-plan type: standard
```

```
RF-channel occupancy using cable-plan: standard
RF-channel 2 is occupied (digital)
RF-channel 3 is occupied (digital)
RF-channel 4 is free
RF-channel 5 is free
RF-channel 6 is free
RF-channel 95 is free
RF-channel 96 is free
RF-channel 97 is occupied (digital)
…
…
RF-channel 135 is free
Scan complete

Analog signals detected on the following 1 RF-channels (cable-plan standard):
 14

Digital signals detected on the following 15 RF-channels (cable-plan standard):
  2   3   7   8   9  17  18  19  20  21  22  49  97  98  99

No signals detected on the following 118 RF-channels (cable-plan standard) and are available for use:
  4   5   6  10  11  12  13  15  16  23  24  25  26  27  28  29  30  31  32  33
 34  35  36  37  38  39  40  41  42  43  44  45  46  47  48  50  51  52  53  54
 55  56  57  58  59  60  61  62  63  64  65  66  67  68  69  70  71  72  73  74
 75  76  77  78  79  80  81  82  83  84  85  86  87  88  89  90  91  92  93  94
 95  96 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117
118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135
ZvCli$
```

Show Last Cable Scan Results

ZvBox remembers the results of the last cable scan performed. This command shows the results.

Syntax

system cable-print-last-scan-results

Example:

ZvCli$ **system cable-print-last-scan-results**

```
Analog signals detected on the following 1 RF-channels (cable-plan standard):
 14

Digital signals detected on the following 15 RF-channels (cable-plan standard):
  2   3   7   8   9  17  18  19  20  21  22  49  97  98  99

No signals detected on the following 118 RF-channels (cable-plan standard) and are available for use:
  4   5   6  10  11  12  13  15  16  23  24  25  26  27  28  29  30  31  32  33
 34  35  36  37  38  39  40  41  42  43  44  45  46  47  48  50  51  52  53  54
 55  56  57  58  59  60  61  62  63  64  65  66  67  68  69  70  71  72  73  74
 75  76  77  78  79  80  81  82  83  84  85  86  87  88  89  90  91  92  93  94
 95  96 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117
118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135

ZvCli$
```

Turn RF Output On/Off

Syntax

set rf-output {off | **on**} **factory default**: on

In normal operation, ZvBox is usually broadcasting something – either live video data from some source, or an internally generated idle screen. However, there are times when it is important to stop broadcasting while certain settings such as programming HDTV channel numbers or the RF channel are changed.

Example:

set rf-output off

Set RF Channel

Sets the RF channel used for broadcast

Syntax

set rf-channel <2..135> **factory default**: **2**

Sets the RF channel frequency used to transmit. The exact frequency follows standard channel placement, and is also a function of the cable channel plan (Standard, HRC, IRC). ZvBox creates a well-formed cable channel, and may be placed next to existing channels without concern.

Note – RF channel changes are usually accompanied by changes to the HDTV channel numbers. HDTVs can become confused if these changes are not done simultaneously. We recommend turning off the RF output while making these changes.

Example:

```
ZvCli$ set rf-output off
Success
ZvCli$ set rf-channel 53
Success
ZvCli$ set mpeg2 program video1 hdtv-channel 53.1
Success
ZvCli$ set rf-output on
Success
```

Set Cable Plan

Establishes the cable channel plan to use for RF channel layout.

Syntax

set cable-plan { **standard** |hrc | irc } **factory default**: **standard**

ZvBox needs to know the plan layout so that it can properly convert the desired RF channel number into the exact RF frequency to transmit. Several different layouts exist, although 'standard' seems to be the most common.

If you are not sure of the cable plan in use in your deployment, run 'system cable-scan cable-plan auto-detect'. It will tell you what cable plan is in use.

Example:

ZvCli$ **set cable-plan standard**
Success

Set RF Output Power

Sets the power level that ZvBox will use when broadcasting.

Syntax

set rf-power {1-lowest | 2-low | 3-medium | 4-high | **5-highest**} **factory default**: **5-highest**

The ZvBox has a maximum output power of 25 dbmv , matching the highest power levels typically entering a home from providers such as FIOS and Comcast. When using a ZvBox to add a channel to an existing lineup, it is important to match the power of existing channels, otherwise adjacent lower-powered channels can be difficult to tune with some televisions.

There are five choices available, each dropping the output power approximately 5 dbmv.

Example:

ZvCli$ **set rf-power 3-medium**
Success

Audio Input Commands

Certain ZeeVee products have several different types of video ports and audio ports. These can be grouped together in a very flexible manner, supporting many different combinations of audio and video in the field.

These commands are used to associate an audio input to a component or VGA video input. It is allowable to use the same audio input for both, although that may not make the most sense.

Associate Audio Input for VGA and Component Inputs

Syntax

set audio-for-component {**analog** | spdif-optical | spdif-coax | usb | none} ZvPro 250
set audio-for-component {analog | spdif-optical | **spdif-coax** | usb | none} ZvBox 150

set audio-for-vga {**analog** | spdif-optical | spdif-coax | usb | none} ZvPro 250
set audio-for-vga {analog | spdif-optical | spdif-coax | **usb** | none} ZvBox 150

The analog input is a stereo left / right pair. Audio is digitized and converted to a Dolby Digital 2.0 stream.

The S/PDIF optical input is a TOSLINK connection that delivers digital audio. The S/PDIF coax input carries the same information in a different physical form. If the received audio is PCM, it is encoded into a Dolby Digital 2.0 stream. All other digital encodings, including 5.1, are directly passed through as-is to the video stream.

If USB is selected, the USB port will present itself as a standard USB audio device to whatever device it is connected. No special software is required to use this connection.

If None is selected, no audio will be passed with the video stream

Example:

ZvCli$ set audio-for-component spdif-optical
Success
ZvCli$ set audio-for-vga analog
Success

Video Input Commands

These commands are used to select what video source to broadcast, and set some parameters for how to process that video.

Select Active Video Source

Selects the video input that will be encoded and broadcast. Audio will be processed based on the audio port associated with the selected video input.

Syntax

set video-source {**component** | vga | idle-screen | test-image-1 | test-image-2} **factory default**: **component**

If the video-source is set to the currently active source, this command is ignored. In very rare occasions, the audio and video processing may need to be restarted. Change the video-source to 'idle-screen' and then back to the previous setting.

If idle-screen is selected, the animated Zv logo is played. If a test image is selected, a fixed test image is displayed. These are designed to help you calibrate your HDTVs. Note – test images are broadcast in 720p

Note that video-source can also be selected via the IR input window on the Zv150 and Zv250. On the Zv250, you can also use the IR input port, and the front panel button. The behavior is identical no matter how you request the switch.

Video Calibration

Calibration is automatically done when ZvBox switches to a new video source. However, that function relies on having video that represents a reasonable color range and screen fill. Use this command if you feel ZvBox needs to recalibrate the incoming VGA video input (e.g. image not centered or color is off).

Syntax

video calibrate-vga

Video Output Commands

These commands are used to set characteristics of the output video.

Set Output Frame Rate for 720p

Set the output frame rate when ZvBox is transmitting an output resolution of 720p. Higher frame rate output has smoother motion with slightly diminished image quality (more blocky). Lower frame rate output has higher image quality with somewhat less smooth motion. Higher frame rate is recommened for applications such as digital signage when a text crawl is used, or for some video where smooth panning of scenes is typical. For most applications, the lower frame rate delivers the best overall experience.

Syntax

set output-frame-rate-for-720p {**30fps** | 60fps} **factory default**: **30fps**

Set Output Resolution for VGA Input

This advanced command is only intended for one specific case, and in almost all cases the default setting of 'auto' should be used.

When the video-source is VGA, ZvBox outputs either a resolution of 720p or 1080p. In almost all situations, it is best to let ZvBox automatically determine which to output, based on the ZvBox model and the resolution of the input source. This command allows one to change this behavior for one specific case. If the video-source is VGA, and the input resolution is 1280x1024, then if in 'auto' mode, the ZvPro-250 product would output 1080p, and the image at the TV would have a black border around it. If you set this setting to '720p', then in this case ZvPro-250 will output 720p, and the image at the TV will have the top 304 lines cropped off.

Syntax

set vga-output-resolution {**auto** | 720p} **factory default**: **auto**

Setting Program (HDTV / Virtual Channel) Information

Within a single RF-Channel, there can be many actual "HDTV channels" – that's what is actually tuned by the TV. In MEPG2, each of the HDTV channels is called a Program. Each program is assigned a number of parameters, with the most important ones being the major and minor HDTV (virtual) channel number – the actual numbers that are used to tune the channel on the HDTV.

Set Channel Name

The channel name is displayed on the HDTV whenever the channel is changed, or when information is requested. This can be very useful, especially when deploying multiple ZvBox channels.

Syntax

set mpeg2 program {video1} **short-channel-name "name"** name <= 7 characters
factory default: ZvCast

set mpeg2 program {video1} **long-channel-name "name"** name <= 64 characters
factory default: Welcome to ZeeVee ZvCast

Example:

```
ZvCli$ set mpeg2 program video1 short-channel-name "new"
Success
ZvCli$ set mpeg2 program video1 long-channel-name "new channel"
Success
```

Set HDTV Channel Number

Tuning to an analog channel is as simple as entering the RF channel number associated with that channel. Not so simple with HDTV channels. Since it is possible to pack multiple digital channels into a single RF channel slot, a new scheme for 'tuning' to those channels was developed. Each program has an HDTV channel number (major and minor) associated with it. That's the number entered at the HDTV to find this channel. It was a way to help with the analog to digital conversion, where digital channels were actually in a different RF slot than

their analog equivalents, but still found by the user on familiar channel numbers. The HDTV Channel is sometimes referred to as a Logical or Virtual Channel.

Syntax

set mpeg2 program {video1} **hdtv-channel** <0..1023>. <0..1023> **factory default**: **2.1**

Example:

ZvCli$ set mpeg2 program video1 hdtv-channel 53.1
Success

Sets the virtual channel to 53.1, which can be tuned in at the HDTV by entering 53.1. Note – Some HDTVs use a dash instead of a dot. Some TVs will also find your new channel if you just enter 53.

Note - We recommend matching the RF channel and the number left of the decimal point. We also recommend using 1 to the right of the decimal. Doing so helps most HDTVs receive your new channel without requiring a full channel scan at each TV. This methodology also seems to reduce the likelihood of conflict, as most cable operators seem to follow this methodology (at least for the left number)

Note - since there are no rules regarding the usage of HDTV channel numbers, in rare cases, you may have a conflict. For example, some other channel may be broadcasting on RF channel 53, but declare its HDTV channel to be 5.1. There will be a conflict if you try to use 5.1 as well. The only way to know for certain if there is a conflict is to perform a full channel scan at the HDTV, and check to see if there are other HDTV channels that conflict with a number that you intend to use.

Note – Changing HDTV channel numbers while still broadcasting can sometimes confuse any connected HDTVs. We require turning off the broadcast (set rf-output off) before making these changes. You may also want to perform a full channel scan at each HDTV after your channel changes are complete, which will clear any memory of old channel locations.

Set Event Information Table (EIT) Name (HDTV Program Guide Entry)

The event information table name is used by some HDTVs that show schedules of upcoming programs. ZvBox is always sending the same "program" – this command allows you to populate a name into that guide. The guide always contains 4 entries, 3 hours long.

Syntax

set mpeg2 program {video1} **eit-name "name"** name <=132 chars
factory default: "Video Over COAX"

Example:

ZvCli$ set mpeg2 program video1 eit-name "New Guide Info"
Success

Set EIT Rating

This command sets a rating for all entries in the program guide. This can be useful if some content should be excluded at some HDTVs.

The values sent follow MPEG2 and CEA-766 specification, region 1 (USA), dimension 0 (TV-Rating). Note that TV-MA-LSV is the most extreme content, with LSV short for "Language, Sex, Violence".

Syntax

set mpeg2 program {video1} **eit-tv-rating {** TV-Y | **TV-G** | TV-PG |TV-14 |TV-MA |TV-MA-LSV**}**

factory default: TV-G

Example:

ZvCli$ set mpeg2 program video1 eit-tv-rating TV-MA
Success

MPEG2 Encoding Control

This group of commands can be used to fine-tune the characteristics of the MPEG2 encoder. The factory defaults have been set to values that produce the best picture, while also maximizing the chance that all HDTVs will correctly display the encoded video. We have found that some HDTVs are sensitive to certain things like total bit-rate or number of bits of DC coefficients. The picture may sometimes break up, or in some cases not display at all!

Experimenting with these settings can improve the quality of the encoded video, but we strongly advise you to test any changes on ***each type of HDTV*** that may receive the signal.

Set Encoding Bit Rate

Syntax

set mpeg2 output-data-rate {low |**normal** | high} **factory default**: **normal**

A digital cable (QAM) RF channel allows for a data rate up to 38.78 Mbps. Usually, that stream is divided into multiple digital channels, each having a lower effective data rate. Since ZvBox is placing a single digital channel in the stream, it can send more data during complex scenes, up to the 38.78 Mbps limit. This can result in significant improvements in video quality for certain very complex scenes. However, some HDTVs will experience some picture breakup if the data rate ever exceeds 19.4 Mbps for a single digital channel. We have observed that this is true of some Sharp HDTVs, and may be true of others.

The Normal will keep the encoder's output data rate to 19.4 Mbps. High will allow the encoder to operate up to 38.78 Mbps.

Example:

ZvCli$ set mpeg2 output-data-rate high
Success

Visual Watermark

ZvBoxes overlay a Zv logo in the lower corner of the broadcast stream. The logo has a 'heartbeat', slowly appearing and disappearing. This is used to identify a ZvBox as being the source of video. This visual mark can be disabled. However, every encoded video stream also has an embedded digital watermark containing information about the ZvBox and system that created it that cannot be removed. This is added to help trace the source of potentially pirated video, and does not affect visual quality in any way.

Syntax

set watermark-visual { off | **on** } **factory default**: **on**

Advanced MPEG2 and Transport Commands

Commands in this section should only be used if you have a strong understanding of MPEG2 encoding management of program streams in a cable environment.

Set Audio Delay

Syntax

set mpeg2 audio-delay <2..10> **factory default**: **5**

In some deployments, audio may not arrive to the ZvBox perfectly synchronized with the video. When this happens, the picture on the HDTV will have a "lip sync" issue. This command allows for skewing of the audio to better match the video.

Each unit is a frame time. The default of 5 is the proper value to use when audio and video are synchronized at the input to ZvBox. Lower values present the audio earlier at the HDTV.

Example:

```
ZvCli$ set mpeg2 audio-delay 4
Success
```

Set DC coefficient precision

Syntax

set mpeg2 dc-coefficient-size {8-bit | 9-bit | **10-bit** | 11-bit} **factory default**: **10-bit**

MPEG2 encoding dynamically produces a DC coefficient matrix while encoding video. The precision (number of bits per value) used to transmit each value to the HDTV can be modified. The highest precision allowed is 11-bits. However, we have found that some HDTVs will not operate at that setting. In those cases, no picture is displayed!

The default setting of 10-bit works with every HDTV that we have tested. Using 11-bit will result in a ***slightly*** better picture, especially in very gradual changes in shade, as well as dark scenes.

Example:

```
ZvCli$ set mpeg2 dc-coefficient-size 11-bit
Success
```

Set Program Number

The program number is an internally used value – in almost all cases you do not need to do anything with it; just use the default. The only time it may need to be changed is if the stream is multiplexed with other streams and there is a conflict.

Note – any time that the program number is changed, video processing ***must be restarted*** using the "system restart" command.

Syntax

set mpeg2 program {video1} **program-number** <1..65535> **factory default**: 1

Example:

```
ZvCli$ set mpeg2 program video1 program-number 1
New value set but will not take effect until ZvBox is restarted.
Use 'system restart' to restart the system.
ZvCli$ system restart
Success
```

There is currently only one named program – video1. This command assigns a program number to that named program.

Set Packet Identifier (PID)

Each MPEG2 packet has a unique identifier in the header that associates each packet with the proper program. This command sets the starting PID number that will be used for all transmissions. It is called the starting number because four PIDs are allocated. The first is for Video packets, the second is for Audio, the third is for the Program information and the fourth is for control information. PID numbers rarely need to be changed.

Note – any time that PID is changed, video processing ***must be restarted*** using the "system restart" command for the new value to take effect.

Syntax

set mpeg2 starting-pid-number <32..8190> **factory default**: 256

Example:

```
ZvCli$ set mpeg2 starting-pid-number  100
Success
ZvCli$ system restart
Success
```

System Maintenance Commands

These commands are used to perform system-level tasks such as downloading new software or setting configuration from saved files. Commands in this section require a USB connection, ZvCli and for some an active internet connection through the computer running ZvCli.

Software Download

The download command is used to update the firmware in ZvBox as well as ZvCli. An internet connection is required, and a ZvBox must be connected. The ZvBox serial number is used by ZeeVee's download servers to download the proper revision of software for that ZvBox.

Syntax

download <check | firmware | zvcli>

Selecting the 'check' option will check for available updates for both the firmware and ZvCli. It does not download them. We recommend doing this step first.

Downloading firmware ('download firmware') will attempt to set the ZvBox firmware to the correct revision as determined by the ZeeVee download servers and the ZvBox serial number. In most cases, if available, newer firmware is loaded. It is possible that an earlier revision is loaded instead – this can happen if some problem was detected in the current firmware, and a step back is preferred.

Although ZvBox can recover from an aborted update, it is recommended that you allow enough time for this process to complete. Roughly 10 minutes are required, excluding the time needed to download the new software.

It is possible that a download check will recommend an older version of ZvCli. This can happen if you connect to an older ZvBox. We recommend keeping your existing (newer) version, unless you prefer to go back.

Configuration Script read / write

These commands are designed to help manage multiple ZvBoxes in large deployments. Script Read will read a text file full of commands and comments and send them to the connected ZvBox. Script Write will read the current parameters out of the connected ZvBox and write them to a file.

Syntax

script write-config-to-file <file>
script read-config-from-file <file>

Example:

```
ZvCli$ script write-config-to-file C:\ZvScripts\configoutput.txt
Configuration written to file
ZvCli$

ZvCli$ script read-config-from-file C:\ZvScripts\configoutput.txt
Reading from "C:\ZvScripts\configoutput.txt"

"set management-mode standalone"
Success
"set audio-for-component analog"
Success
"set audio-for-vga analog"
Success
"set cable-plan standard"
Success
"set rf-channel 4"
Success
"set rf-output on"
Success
"set rf-power 5-highest"
Success
"set vga-output-resolution auto"
Success
"set video-source vga"
Success
"set watermark-visual on"
Success
"set mpeg2 dc-coefficient-size 10-bit"
Success
```

```
"set mpeg2 output-data-rate normal"
Success
"set mpeg2 starting-pid-number 256"
Success
"set mpeg2 program video1 eit-name "eit name""
Success
"set mpeg2 program video1 eit-tv-rating TV-14"
Success
"set mpeg2 program video1 long-channel-name "long channel name""
Success
"set mpeg2 program video1 program-number 1"
Success
"set mpeg2 program video1 short-channel-name "shortpn""
Success
"set mpeg2 program video1 hdtv-channel 400.0"
Success

Done reading from file

ZvCli$
```

Send Troubleshooting Report

This command is used to send information to ZeeVee through the internet. It contains a tremendous amount of information that can help the ZeeVee support team diagnose problems and help you. Please allow the command time to complete – it may take a minute or two.

Syntax

system send-troubleshooting-report

Example:

```
ZvCli$ system send-troubleshooting-report
Sending troubleshooting report...
    Getting system status...
    Getting configuration...
    Getting ZvBox log file...       Success
    Getting firmware log file...   Success
    Getting TVRF log file...        Success
    Getting free channels list...  Success
    Sending report...
        Report was sent successfully.
ZvCli$
```

Advanced Firmware Download and Installation Commands

The simplest way of downloading and installing firmware to a ZvBox is by using the “download firmware” command. This command requires that you are connected to both the Internet and a ZvBox, and that you want to download the latest firmware as determined by ZeeVee’s download server. If you wish to download/install a particular version, or if you do not have access to the Internet while connected to the ZvBox, then you will use the advanced commands.

The advanced download commands allow you to:

- View available downloadable firmware images on ZeeVee's download server.
- Download specific firmware images from ZeeVee's download server to your computer without needing a connection to a ZvBox.
- Install a specific firmware image to ZvBox without an Internet connection.

Displaying Downloadable Firmware Images on ZeeVee's Download Server

One can see what firmware images are available to be downloaded. The optional 'passphrase' can be used if ZeeVee has given you a specific passphrase that allows you to see additional downloadable versions of firmware.

Syntax

download advanced show-downloadable-firmware [passphrase "passphrase"]

Example:

ZvCli$ download advanced show-downloadable-firmware

ZeeVee's download server found the following firmware versions:

ZvPro-250 version 2.0.0.6665
Filename: 2_0_0_6665.gpg2
Description: released for Zv250
*This is the latest production version for the ZvPro-250
*This version is suggested for the attached ZvPro-250

ZvBox-150 version 2.0.2.7076
Filename: 2_0_2_7076.gpg2
Description: released for ZV150
*This is the latest production version for the ZvBox-150

ZvCli$

Downloading a Firmware Image from ZeeVee's Download Server

One can download a specific firmware image from the download server. You can specify a particular image if you use the optional 'filename' argument, or if you do not you will get the latest production firmware for that model.

Syntax

download advanced get-downloadable-firmware model {ZvPro-250 | ZvBox-150} [filename "name"]

Example:

ZvCli$ download advanced get-downloadable-firmware model ZvPro-250

The latest production firmware for the ZvPro-250:

ZvPro-250 version 2.0.0.6665
Filename: 2_0_0_6665.gpg2
Description: released for Zv250
*This is the latest production version for the ZvPro-250

Downloading file 2_0_0_6665.gpg2 from server...
583639 / 19002258 bytes downloaded
4918539 / 19002258 bytes downloaded
7504039 / 19002258 bytes downloaded
14107619 / 19002258 bytes downloaded
19002258 / 19002258 bytes downloaded
Download from server to local file system successful

ZvCli$

Display Downloaded Firmware

This command shows what versions of firmware have been download to the computer and are available to be installed to ZvBox.

Syntax

download advanced show-downloaded-firmware

Example:

ZvCli$ download advanced show-downloaded-firmware

```
Model       Filename
-----       --------
ZvPro-250   2_0_0_6665.gpg2
ZvBox-150   2_0_2_7076.gpg2
```

ZvCli$

Install Downloaded Firmware to ZvBox

Once the firmware image has been downloaded to the computer, it can be installed to the ZvBox.

Syntax

download advanced install-downloaded-firmware filename "name"

Example:

ZvCli$ download advanced install-downloaded-firmware filename "2_0_0_6665.gpg2"
Installing firmware to ZvBox...
..... 30 secs 9% transferred
..... 60 secs 19% transferred
..... 90 secs 29% transferred
..... 120 secs 40% transferred
..... 150 secs 50% transferred
..... 180 secs 59% transferred
..... 210 secs 70% transferred
..... 240 secs 81% transferred
..... 270 secs 92% transferred
.....
Success

ZvCli$

Remove Downloaded Firmware from Computer

This command allows you to remove the firmware images that you have stored on your computer.

Syntax

download advanced remove-downloaded-firmware

Example:

```
ZvCli$ download advanced remove-downloaded-firmware

Removed file: 2_0_0_6665.gpg2 (ZvPro-250)
Removed file: 2_0_2_7076.gpg2 (ZvBox-150)

ZvCli$
```

Miscellaneous Commands

Transmit IR Codes for Learning

ZeeVee products that have multiple video inputs can be told to switch inputs via an IR command to their IR input window, located on the front plate, right side on the 250; LED window on the 150. These commands send the proper IR code for that switch out of that same window, making it possible to 'teach' the IR command to a "learning" remote or remote control system. The IR command is sent once each time the ZvCli command is entered.

Syntax

system transmit-ir {video-source-component | video-source-vga | video-source-idle-screen}

Set Date

Used to set the system time in the connected ZvBox.

Note - the 150 does not have an on-board clock that survives power cycles.

When setting the time from your PC, use the local time and it will be converted to Universal Coordinated Time (UTC) and sent to the device. E.g. if your PC is configured in Eastern Standard Time, enter time in Eastern Standard. When setting the time using the ZvCli on the serial port of ZvBox, use UTC time.

Syntax

set date year <year> month <month> day <day> hour <hour> minute <minute> second <second>

All parameters are integers.

Example:

```
ZvCli$ set date
 # Set date/time to the box
 # Use local time, it will be converted to coordinated universal time (UTC)
 # Local time: Thu 2009-Jan-29 15:39:07 Eastern Standard Time
 set date year <year> month <month> day <day>  hour <hour> minute <minute> second <second>
    <year>={2008-2028}
    <month>={1-12}
    <day>={1-31}
    <hour>={0-23}
    <minute>={0-59}
```

<second>={0-59}
e.g. set date 2009 01 29 15 39 07
ZvCli$ **set date year 2008 month 01 day 06 hour 09 minute 04 second 00**
Sets the date to January 6, 2008, 9:04 AM

Set Management Mode

This command controls how the ZvBox will be deployed.

- Standalone mode is used when ZvBox will be used in a mode where it is simply capturing video and broadcasting the information, and has no need for on-the-fly changes. This is the most common mode used in commercial deployments. This mode is presently only supported on Zv150 and Zv250.
- Managed Mode means that the ZvBox is always connected to software running on a computer (ZvManager) that controls every aspect of its operation. This mode is presently only supported on Zv100's.

Syntax

set management-mode {**standalone** | zv-manager} **factory default**: **standalone**

Set Name

This command gives a name to the ZvBox that you are managing. Naming your ZvBox not only gives it a sense of pride and self worth, but can also be useful when managing multiple ZvBoxes. Most users find the channel that the ZvBox is transmitting on is a useful name, e.g. "4" or "4.1".

Syntax

set name "name"

Reset to Factory Defaults

This command resets all settings to their original factory defaults. It is especially useful when some prior configuration change causes the system to malfunction. Defaults are listed in this document in the command summary, and with each command description. It is suggested that you restart ZvBox after restoring default settings via "system restart".

Syntax

set to-factory-defaults

Reboot ZvBox

This command forces the ZvBox to completely reboot. It should never be required, but may be helpful as a diagnostics aid. It will take several minutes to execute.

Syntax

system reboot

Restart Video Processing

This command tells ZvBox to completely restart all video processing. The broadcast will temporarily stop, and will resume when the restart completes. This command is ***required*** after making changes to some of the MPEG2 settings (e.g. program number or starting pid number).

Syntax

system restart

ZvCli and Serial Console Command Summary

Factory defaults are underlined where applicable. {} encase a choice. <> encase a value. [] encase optional parameters.

Status Commands

show system-status
show av-status
show config
show analysis
show zvcli-info

RF, Cable and Broadcast Commands

system cable-scan [**cable-plan** {standard |HRC | IRC | **auto-detect**}]
system cable-print-last-scan-results
set rf-output {off | **on**}
set rf-channel <**2**..135>
set cable plan {**standard** |HRC | IRC }
set rf-power {lowest | low | medium | high | **highest**}

Audio Input Commands

set audio-for-component {analog | spdif-optical | spdif-coax | usb | none}
factory default: ZvPro 250 – analog, ZvPro 150- spdif-coax
set audio-for-vga {analog | spdif-optical | spdif-coax | usb | none}
factory default: ZvPro 250 – analog, ZvPro 150- usb

Video Input Commands

set video-source {**component** | VGA | idle-screen}
video calibrate-vga

Video Output Commands

set output-frame-rate-for-720p {**30fps** | 60fps}
set vga-output-resolution {**auto** |720p}

Setting Program (HDTV Channel) information

set mpeg2 program {video1} **short-channel-name "name"** name <= 7 characters
factory default: ZvCast
set mpeg2 program {video1} **long-channel-name "name"** name <= 64 characters
factory default: Welcome to ZeeVee ZvCast
set mpeg2 program {video1} **hdtv-channel** <0..1023>**.**<0..1023>
factory default: 2.1
set mpeg2 program {video1} **eit-name "name"** name <=132 chars
factory default: "Video Over COAX"
set mpeg2 program {video1} **eit-tv-rating** {TV-Y | **TV-G** | TV-PG |TV-14 |TV-MA |TV-MA-LSV}
factory default: TV-G

MPEG2 Encoding Control

set mpeg2 output-data-rate {low | **normal** | high} **factory default**: normal
set watermark-visual {off | **on**}

Advanced MPEG2 and Transport Controls

set mpeg2 audio-delay <2..10> — **factory default**: 5
set mpeg2 dc-coefficient-size {8-bit | 9-bit | **10-bit** | 11-bit} — **factory default**: 10-bit
set mpeg2 program video1 program-number <**1**..65535> — **factory default**: 1
set mpeg2 starting-pid-number <32..8190> — **factory default**: 256

System Maintenance Commands (Require connection via USB and ZvCli)

download check Requires an Internet connection
download firmware Requires an Internet connection
download zvcli Requires an Internet connection
script read-config-from-file <file>
script write-config-to-file <file>
send troubleshooting-report Requires an Internet connection

Advanced Firmware Download and Installation Commands (Require connection via USB and ZvCli)

download advanced show-downloadable-firmware [passphrase "phrase"]
download advanced get-downloadable-firmware model {ZvPro-250 | ZvBox-150} [filename "name"]
download advanced show-downloaded-firmware
download advanced install-downloaded-firmware filename "name"
download advanced remove-downloaded-firmware

Miscellaneous commands

system transmit-ir {video-source-component | video-source-vga | video-source-idle-screen}
set date year <year> **month** <month> **day** <day> **hour** <hour> **minute** <minute> **second** <second>
set management-mode {**standalone** | zv-manager}
set name "name"
set to-factory-defaults
system reboot
system restart
help
quit –or- **exit**
 # - start of comment, only available when using script files

Shortcuts for using the CLI

- Hitting <TAB> in the middle of a command will auto-complete the command or give help
- Hitting up-arrow will show the previous command (back into history)
- Hitting down-arrow will show the next command

Communications Problems

If the ZvBox is operating in "Managed-mode" and ZvManager is running, you need to stop ZvManager before ZvCli can connect to the ZvBox. If you are still having problems,

- make sure ZvCli is running and ZvManager (if installed) is closed
- disconnect and reconnect the USB cable between ZvBox and the computer
- If that does not work, power-cycle ZvBox. After a few minutes, ZvCli should report that it is connected

Serial Port Specifications:

- Protocol: RS-232, 9,600 baud, 8 bits, no parity, 1 stop bit, software (Xon / Xoff) flow control